

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1 1-17. (Canceled)

1 18. (Currently Amended) A differential GMR sensor, comprising:

2 a first self-pinned GMR sensor having a first pinned layer, a first spacer layer and
3 a first free layer;

4 a second self-pinned GMR sensor having a second pinned layer, a second spacer
5 layer and a second free layer; and

6 a bias structure disposed between the first free layer of the first self-pinned GMR
7 sensor and the second free layer of the second self-pinned GMR sensor, wherein the bias
8 structure is configured to provide antiparallel magnetizations for the first and second free
9 layers without using an antiferromagnetic layer, wherein the bias structure further
10 comprises four ferromagnetic layers separated with three interlayers.

1 19. (Currently Amended) The sensor of claim 18, wherein the ~~bias structure~~
2 ~~further comprises~~ four ferromagnetic layers separated with three interlayers are selected
3 to provide a desired gap length.

1 20. (Original)

1 21. (Currently Amended) The sensor of claim [[20]] 18, wherein the four
2 ferromagnetic layers further comprise four NiFe layers.

1 22. (Currently Amended) The sensor of claim 21, wherein the four NiFe
2 layers comprise a nickel composition of 90%.

1 23. (Currently Amended) The sensor of claim [[20]] 18, wherein the three
2 interlayers further comprise ruthenium.

1 24-33. (Canceled)

1 34. (Currently Amended) A magnetic disk recording system, comprising:
2 a magnetic storage medium having a plurality of tracks for recording of data; and
3 a magnetic transducer maintained in a closely spaced position relative to the
4 magnetic storage medium during relative motion between the magnetic transducer and
5 the magnetic storage medium, the magnetic transducer including a magnetoresistive read
6 sensor, the magnetoresistive read sensor further comprising:
7 a first self-pinned GMR sensor having a first pinned layer, a first spacer
8 layer and a first free layer;
9 a second self-pinned GMR sensor having a second pinned layer, a second
10 spacer layer and a second free layer; and
11 a bias structure disposed between the first free layer of the first self-pinned
12 GMR sensor and the second free layer of the second self-pinned GMR sensor, wherein
13 the bias structure is configured to provide antiparallel magnetizations for the first and
14 second free layers without using an antiferromagnetic layer, wherein the bias structure
15 further comprises four ferromagnetic layers separated with three interlayers.

1 35. (Previously Presented) The magnetic disk recording system of
2 claim 34, wherein the ~~bias structure further comprises~~ four ferromagnetic layers separated
3 with three interlayers are selected to provide a desired gap length.

1 36. (Canceled)

1 37. (Currently Amended) The magnetic disk recording system of claim
2 [[36]] 34, wherein the four ferromagnetic layers further comprise four NiFe layers.

1 38. (Currently Amended) The magnetic disk recording system of claim 37,
2 wherein the four NiFe layers comprise a nickel composition of 90%.

1 39. (Currently Amended) The magnetic disk recording system of claim
2 [[36]] 34, wherein the three interlayers further comprise ruthenium.

1 40-50. (Canceled)